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The Withdrawal of the State from Economic Activity: An Austrian Capital Market Perspective

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Abstract

In this paper we investigate the success of recent privatization in Austria from a capital market perspective. The empirical analysis draws upon the concept of initial public offerings indexes to document the medium-run aftermarket performance of initial public offerings (IPOs). Due to certain peculiarities, governmental IPOs outperform non-governmental IPOs in terms of cumulative average returns. Among the approaches discussed, the theory of property rights, together with the economic theory of politics, appears to be particularly appealing in explaining this phenomenon. If market participants adjust their investment decisions accordingly, the superior performance of governmental IPOs must, however, be expected to vanish during later stages of a privatization program. The withdrawal of the state from the ownership of enterprises has repercussions on the expansion of existing private companies due to rising capital costs. Privatization programs thus temporarily inhibit the substitution of inside equity by outside equity in private companies.

Zusammenfassung

Diese Arbeit untersucht den Erfolg der jüngsten Privatisierungen in Österreich aus der Perspektive des Kapitalmarktes. Um die mittelfristige Performanz von Neuemissionen auf dem Wiener Sekundärmarkt zu dokumentieren, werden verschiedene Erstemissionsindexes (IPOX) konstruiert. Wir zeigen, daß sich Erstemissionen mit öffentlichem Voreigentümer im Vergleich zu solchen mit privatem Voreigentümer überdurchschnittlich gut entwickeln. Unter den Ansätzen, die zur Erklärung dieses Phänomens diskutiert werden, erweist sich besonders die Theorie der Eigentumsrechte sowie die Ökonomische Theorie der Politik als schlüssig. Da zu erwarten ist, daß die Marktteilnehmer ihr Investitionsverhalten den aufgezeigten Möglichkeiten zur Erzielung einer überdurchschnittlichen Rendite anpassen werden, ist während späterer Phasen eines Privatisierungsprogrammes mit einem Abbau der Überperformanz staatlicher Neuemissionen zu rechnen. Der Rückzug des Staates aus der Wahrnehmung ökonomischer Aktivitäten hat daneben Rückwirkungen auf die Expansionsmöglichkeiten privater Unternehmungen. Aufgrund steigender Kapitalkosten gewinnt zumindest temporär die Innenfinanzierung gegenüber der Außenfinanzierung an Attraktivität.

Keywords

Initial public offerings, privatization, stock market index, performance analysis.

JEL-Classifications

C33, G12, C43, G14

1. Introduction

One of the most remarkable issues of recent economic policy is the widespread withdrawal of the state from economic activity. Perceiving privatization as a remedy for persistent state failure, about a decade ago European governments set out to strengthen private sector activities. But it was not before the beginning of the transition process in Central and Eastern Europe that privatization issues became a major research topic. In striking contrast to the plethora of investigations on the institutional design of privatization programs and their efficiency on the corporate level, the literature is remarkably silent on the success of privatization efforts from a capital market perspective. In particular, little empirical research has been undertaken to document the capital market performance of formerly state-owned companies, and hardly any attention has been paid to study the interrelationship between privatization and its repercussions on the going publics of private companies.

Governmental IPOs differ from non-governmental IPOs in several respects. First, governmental IPOs are usually part of a privatization *program*. Hence, the success of the early issues may affect the receptivity of the capital market for subsequent issues. In the case of private enterprises, by contrast, for a period of several years the issuing activity is frequently limited to the initial public offering itself. In the case of Austria, only three out of 26 enterprises undertook a secondary offering during the first one and a half years after the initial public offering. Second, as long as formerly state-owned enterprises are not fully privatized due to the fact that governmental authorities retain a significant stake in the enterprise for strategic purposes, investors may demand a risk-premium to be compensated for the risk of financially disadvantageous governmental intervention. Third, as we will hypothesize later on, unlike non-governmental IPOs, governmental IPOs may have a considerable potential for efficiency gains which can only be exploited after privatization.

In the present study we examine the medium-run aftermarket performance of governmental versus non-governmental Austrian initial public offerings (IPOs). Drawing upon three concepts commonly advanced to explain the failure of state intervention, we show how the withdrawal of governmental influence sets the stage for the financial market success of formerly state-owned companies. Our theoretical considerations culminate in the formulation of three hypotheses on the superior performance of governmental IPOs versus non-governmental IPOs in terms of cumulative average returns. For the subsequent empirical analysis we apply the concept of initial public offerings indexes as a tool to measure the aggregate price dynamics of various portfolios of governmental and non-governmental IPOs. In order to evaluate our empirical findings also in a risk-return framework, we calculate Sharpe's (1966) portfolio performance index.

The paper is organized as follows. In chapter 2 we present theoretical concepts suggested to account for the failure of state intervention in Austria. Later on, we will scrutinize the very same concepts for their explanatory power regarding our empirical analysis. Chapter 3 focusses on the steps that have been undertaken in preparation of the privatization of the Austrian nationalized industry. In chapter 4 we discuss previously established peculiarities in the aftermarket performance of initial public offerings. We also elaborate three testable hypotheses that suggest the presence of another, forth property of the market segment of initial public offerings. Chapter 5 exposes methodological issues in determining the aftermarket performance of governmental and non-governmental IPOs. The analysis of chapter 6 tests the empirical validity of our hypotheses, and chapter 7 contains concluding remarks.

2. The Failure of State Intervention

Up to the crisis of the Austrian nationalized industry during the mid-eighties, the concept of Austro-Keynesianism implied the instrumentalization of the nationalized industry for the purpose of economic policy. NOWOTNY (1979) identifies three primary objectives: (1) to retain and secure high levels of production and aggregate demand instead of maximizing shareholder value; (2) to detain microeconomically reasonable measures with a macroeconomically contractive effect by the development of new products for growing markets and by the retraining of employees; (3) to reduce the average level of uncertainty in the economy in order to generate a positive impact on investors' expectations and thereby to stimulate investment. The implementation of these targets is reflected by a comparatively high investment quota, an anti-cyclical investment policy, and the stabilization of consumption by means of income policy. These results have, however, been reached at the cost of a relatively low cash-flow per employee and a poor return on equity (TICHY, 1983).

Within the 1982-1986 period the cumulated losses of the nationalized industry mounted to about 37 billion Austrian schillings (ATS).¹ But the successful recapitalization and restructuring of the worn-out enterprises involved more than just financial aid from governmental sources, it also meant the rethinking of the role of Austro-Keynesianism in economic policy (OSTLEITNER, 1990). It was the striking failure of state intervention which then gave impetus to prepare the privatization of the Austrian nationalized industry.

¹ Based on the average Schilling/US Dollar exchange rate over this five-year-period this sum equals 2 billion US Dollars.

Three concepts have been suggested in the literature which may help explain the failure of state intervention.² According to the economic theory of politics, politicians attempt to accomplish their personal objectives under the condition of being reelected (BÖS, 1978; KOHN, 1982). In this context the nationalized industry was regarded as an instrument to increase the probability of winning the next elections by means of employment and income policy. As a consequence microeconomic efficiency was neglected in favor of macroeconomic stability.

A second approach to the issue of inefficiency of state-owned enterprises is represented by the theory of property rights. In large enterprises the usual separation of ownership and management gives rise to a principal-agent problem. Furthermore, suppose that the personal objectives of managers and owners differ from each other (ALCHIAN and DEMSETZ, 1972; JENSEN and MECKLING, 1976; FAMA, 1980). Given an informational asymmetry between the principal and the agent in favor of the latter, under a fixed income contract managers will attempt to reduce work effort and to increase perk consumption instead of maximizing profits. Managers may also try to build up some financial slack to cover losses from mistaken decisions. Managerial labor markets and the market for corporate control, however, limit the self-seeking interest of managers since influential owners are in the position of (costly) reducing the informational asymmetry and to replace the management. In contrast to private enterprises, in the case of state-owned companies the market for corporate control is less effective in securing efficient production. Since there is only a minor or even no financial remuneration for efficiency gains, politicians as the representatives of the owner have only little incentive to exert tight control.

The economic theory of bureaucracy as a third approach emphasizes the lack of competition in state-owned companies. It is constituent for this approach that the presence of bureaucratic rigidities discourages entrepreneurial action. If the managerial income is also largely independent of business performance, managers' attention focusses on the 3 Ps (NISKANEN, 1971, 1975), that is managers maximize pay, power, and prestige. Since the realization of the 3 Ps is highly correlated with the department size and the budget, managers have only little incentive for the sparing use of resources.

² For an overview of theoretical concepts that explain the appearance of systematic inefficiencies in the nationalized industry see BARTEL and SCHNEIDER (1987).

3. Preparing Privatization

Being subject to the interest of political parties in its employment policy as well as strategic orientation, the ÖIAG (Österreichische Industrieverwaltung, after 1986 to be read as Österreichische Industrieholding AG) suffered from a virtual halt of structural adjustments that were necessary to bring about substantial productivity gains as a precondition for future prosperity. The restructuring of the nationalized industry ÖIAG started with the establishment of decentralized branch holdings as separate profit centers in preparation of their subsequent partial or complete privatization. Though not being explicitly expressed as a target variable, profitability is regarded as a key element in the enterprise reform process.

From the perspective of the federal budget, profitability came to play a dual role. First, the federal government guarantees the long-term securities issued by the ÖIAG to finance restructuring. By this way the burden to the federal budget is stretched over time without increasing the cumulated federal debt from a legal point of view. In this respect profits represent the means to alleviate the burden of interest and principal payments with which the federal budget may be charged in the future. Second, apart from pilot privatization before 1990, the privatization process gained impetus only during the first half of the nineties. With Austria joining the European Union in 1995, the Maastricht criteria became relevant for Austrian fiscal policy as well. Given the expansion of public debt from 58.4 % of GDP in 1992 to 64.6 % in 1994, Austria is rapidly departing from the Maastricht general government gross public debt criterion which stipulates a public debt limit of 60 % of GDP. The endeavors to meet this criterion may be facilitated by revenues from the privatization of state-owned enterprises whose success largely hinges on the profitability of the enterprises to be sold. Hence, there is a link between the degree of fiscal tightness necessary to meet the convergence criteria and the profitability of the enterprises. In addition to fiscal considerations, profits are particularly welcome to enhance the enterprises' endowment with equity in order to foster their immunization against future economic downturns.

In 1986 the ÖIAG Group consisted of more than 300 enterprises with about 94,000 employees in Austria. At its height employment in the state-owned industries culminated in 25% to 30% of total industrial employment. ITZLINGER, KERSCHBAMER, and VAN DER BELLEN (1989) supposed this value to be the highest share in industrial employment across Western Europe. The privatization of ÖIAG enterprises started with the public offering of Österreichische Mineralölverwaltung (Austrian Mineral Oil Group, ÖMV, since 1995 OMV) shares in December 1987 shortly after the October stock market crash. The offering price was ATS 440.00 per nominally ATS 100. The significance of timing an issue favorably with respect to its budgetary impact becomes evident when we compare this price with the ATS 824.00 per ATS 100 nominal capital gained for a secondary offering in 1989. This amounts to a 87.3 % difference per share in the offering price. While the 15 % stake in OMV

was worth only ATS 1.32 bill., two years later the issue of 10 % of OMV's capital reached a market value of ATS 1.67 bill.³

In view of the observation that the volume of Austrian going public shows a strongly pro-cyclical pattern regarding the performance of the representative stock index, at first sight it is a surprising fact that the December 1987 issue of OMV has not been postponed. Though facing severely constrained opportunities to raise revenue for the federal budget by the stock market crash, the involved governmental authorities nevertheless opted for the go-ahead alternative of privatization. The reasons for this decision are to be found both in the domain of capital market considerations and institutional aspects. As for capital market considerations, it is notoriously difficult to determine the future development of stock prices. Therefore it might have been possible in the 1987/1988 post-crash period that stock prices would not recover as quickly as they actually did, or they might even have continued their decline. In this case the privatization process would have been stalled before its beginning. Institutional aspects seem to be of even greater importance. Taking into account the difficulties in harmonizing conflicting interests and of obtaining the approval of a multitude of institutions, postponing the issue would have implied to enter the tedious process of consensus-building once again. The decision to realize the path-breaking going public of OMV despite the stock price baisse may therefore be regarded as being primarily motivated by political rather than economic aspects. The fact that the initial public offering was confined to a mere 10 % stake in OMV's nominal capital may have additionally contributed to overcome reservations against the said date of the going public.

Since 1992, another ten ÖIAG companies have (at least partially) been privatized (table 1). Altogether six former ÖIAG companies are now listed on the Vienna Stock Exchange.

Table 1
The Austrian privatization history

| Date | Privatized stake | Company |
|---------------|------------------|----------------------------------|
| July 1992 | 26 % | SGP-Verkehrstechnik GmbH |
| December 1993 | 48 % | |
| December 1992 | 49 % | Voest Alpine Eisenbahnsysteme AG |
| November 1993 | 25 % | |
| November 1994 | 26 % | |

³ Until June 1995 the stake of ÖIAG in OMV has been reduced to 49.9 % which is mainly due to the sale of a 20 % stake to IPIC (Abu Dhabi) in May 1994.

| Date | Privatized stake | Company |
|--|------------------|---|
| July 1993 July 1994 | 74 % 26 % | Austria Mikro Systeme International AG |
| November 1993 | 100 % | Austria Sekundär-Aluminium Ges.m.b.H. |
| May 1994 | 51 % | Voest Alpine Technologie AG |
| November 1994 | 100 % | AT&S Austria Technologie & Systemtechnik GmbH |
| March 1995 | 27.3 % | Böhler-Uddeholm AG |
| March 1995 | 100 % | Schoeller-Bleckmann GmbH |
| May 1995 | 100 % | Bernhard Steinel GmbH |
| October 1995 | 56.65 % | Voest Alpine Stahl AG |
| Source: ÖSTERREICHISCHE INDUSTRIEHOLDING AG, 1995. | | |

VICKERS and YARROW (1991) suggest to characterize privatization programs according to the relative importance of three different types of privatization. Privatization of the first category pertains to state-owned enterprises that operate in competitive product markets which are free of substantial market failures (*privatization of competitive firms*). The second category relates to the privatization of firms that operate in markets in which they are able to exert substantial market power (*privatization of monopolies*). The transfer of services previously performed by public sector organizations to the private sector constitutes the third type of privatization (*contracting out*).

Austrian privatization so far corresponds primarily to type 1. Even if in the past some of the privatized companies were operating in one or the other highly concentrated market in Austria, at present they are confronted with significant competition in almost all markets; in particular so since Austria joined the European Union (EU) which implies that firms from all EU countries are granted access to state procurement on an equal footing with Austrian suppliers. Austrian privatization is therefore quite similar to French privatization but different from privatization in the United Kingdom or in the United States. In France, however, banking and insurance have been subject to extensive privatization as well.

4. Characteristics in the Pricing of Initial Public Offerings

We now turn to the issue of pricing an initial public offering (IPO). Three peculiarities in the pricing of initial public offerings have been established in the literature. Ordered according to the relevant time-horizon, these are the underpricing phenomenon, the “hot issue” market notion, and the concept of long-run underperformance. Prior to exploring a forth, hitherto unnoticed property of the IPO market segment, we briefly review the other concepts.

The *short-run underpricing phenomenon* has been well-documented in the literature. Using a sample of 8,668 IPOs going public between 1960 and 1987, for the United States IBBOTSON, SINDELAR, and RITTER (1988) find an average return of 16.4 % from the offering price to the market price at the end of the first day of trading. It is interesting to note that in a similar study on 1,030 US-IPOs RITTER (1987) reveals that contingent on the issuing method average returns differ widely. While firm-commitment cash offers, that is investment banks act as underwriters, are, on average, underpriced by about 15 %, the initial return of best-effort going public is more than three times as large (approximately 48 %). In an analysis related to 92 German IPOs between 1961 and 1987, WASSERFALLEN and WITTELEDER (1994) find an average initial return exceeding 15 percent.

Besides other hypotheses offered to explain this phenomenon, the most widely accepted hypothesis has been proposed by ROCK (1986). Suppose that informational asymmetries between two different groups of investors exist. The first group consists of informed investors who will avoid overpriced IPOs but will heavily bid for underpriced issues. The second group of uninformed investors, who know only about the usual average underpricing of IPOs, will bid evenly for all IPOs. Since the most strongly underpriced issues will under such circumstances be most heavily oversubscribed, the allotment of shares to the average investor will be inversely related to the attraction of the IPO. Therefore the average investor is not able to earn that abnormally high return but may suffer from the winner's curse (CAPEN, CLAPP, and CAMPBELL, 1971; THALER, 1988), that is the winning bid may exceed the value of the issue. In order to counteract the winner's curse, underwriters choose to underprice the issue.

Contrary to the short-run underpricing phenomenon, the other two properties have found considerably less attention in the literature. The *hot issue market* phenomenon refers to the observation that particular stock issues rise from their offering prices to higher than average premia in the aftermarket. In particular, statistical tests indicate serial correlation during the early months of aftermarket trading (IBBOTSON, SINDELAR, and RITTER, 1988; IBBOTSON and JAFFE, 1975). Most recently, RITTER (1991) has established the anomaly of *long-run underperformance*. In the USA during the period from 1975 to 1984 initial public offerings substantially underperformed a sample of matching firms from the closing price on the first day of public trading to the market price on their three-year anniversaries. While to date no benchmark explanation(s) of these phenomena has been developed yet, empirical evidence hints at a relationship between the two. Enterprises with a comparatively short business history are companies which constituted considerable fractions of past hot issue markets, such as the electronic, biotechnology, and software fads. The same category of enterprises shows a remarkably worse long-run aftermarket performance on average.

Subsequently, we will derive, and later on test, three hypotheses on the performance of governmental IPOs relative to the performance of non-governmental IPOs. These hypotheses, if correct, have an extensive bearing for the pricing of new issues in that they indicate the presence of a forth, yet unexplored phenomenon in the medium-run aftermarket performance of initial public offerings.

In the second chapter of this paper we discussed three approaches which are commonly advanced to explain inefficiencies in public enterprises. If one finds the propositions of these models convincing, they may also bear some explanatory power for the issue at hand. In particular, the theory of property rights and the economic theory of politics appear to have promising implications in explaining the distinct performance of governmental versus non-governmental initial public offerings. The theory of bureaucracy, by contrast, seems to be of less importance in this respect since state-owned companies may - like private enterprises - design incentive compatible contracts for managerial positions well in advance of privatization.

The theory of property rights posits a direct link between the issue of corporate control and the efficiency of enterprises. After their going public privatized enterprises should find themselves under intensified domestic and - if being sufficiently large - foreign monitoring activities. By reducing the degree of informational asymmetry, such activities narrow the scope for the build-up of financial slack while they largely reveal the effectiveness of managerial efforts to maximize shareholder value. Since monitoring activities are costly, they will only be undertaken if the monitoring institutions have a self-interest in doing so, which is, by definition, only the case after privatization.

The economic theory of politics has a particularly appealing bearing on post-issue microeconomic efficiency gains in public enterprises. The abolishment of state intervention cannot, however, be expected to lead to an instant improvement of efficiency but will rather entail a longer period of efficiency gains. This effect is due to the successive elimination of only marginally or even non-profitable technologies and activities and a possible re-orientation of the enterprise. Under the condition that the time lag between the abolishment of state intervention and the going public is not too large, this approach contributes to explain the superior performance of governmental IPOs. We thus have

Hypothesis 1: Under conditions as specified by the theory of property rights and the economic theory of politics, governmental initial public offerings will on average show positive excess returns vis-à-vis the market average.

We now turn to the second issue, viz. the excess performance of governmental IPOs versus non-governmental IPOs. Taking into account that the preceding considerations

regarding potential efficiency gains of formerly state-owned enterprises do not or at least not to such an extent apply to private enterprises, we immediately have

Hypothesis 2: Governmental initial public offerings will on average outperform non-governmental initial public offerings.⁴

If governmental IPOs regularly outperform non-governmental IPOs, rational underwriters will intensify their participation in biddings for governmental IPOs but will refrain from bidding for non-governmental IPOs since regularly underperforming stocks impair their "reputation capital." This behavior, in turn, should have a corrective effect on the mispricing of initial public offerings. As for the investors' side, underpricing of governmental IPOs should result in extensive oversubscription of governmental IPOs and vice versa which should have a similar corrective effect on the offering price. This leads us to

Hypothesis 3: Hypotheses 1 and 2 are valid only during an initial learning phase of market participants. If the envisaged efficiency gains turn out to be actually attainable on average, the excess performance of governmental IPOs that are scheduled late in a privatization program will wane.

5. The Aftermarket Performance of Governmental and Non-Governmental IPOs: Methodology

Subsequently, we introduce the concept of an Initial Public Offerings Index (IPOX) (HAEFKE and HELMENSTEIN, 1996a) which is essential to the empirical analysis that follows in the next chapter. We begin with a brief description of the Austrian Traded Index (ATX) - the representative stock market index of the Vienna Stock Exchange - to which we will relate the results obtained for the price dynamics of governmental and non-governmental IPOs.

The Austrian Traded Index ATX

At the foundation of the Austrian Futures and Options Exchange, ÖTOB, the Austrian Traded Index (ATX) was constituted to fulfill both descriptive and operative functions. As an aggregate market indicator the ATX documents the price dynamics

⁴

It is noteworthy that this hypothesis does not rest on the common conjecture of informational asymmetries of the kind that the previous owners of private enterprises possess the advantage of insider knowledge on the future prospects of their enterprise. If this were the case, the timing of the issue may indeed be chosen in favor of the former owners with the consequence that governmental IPOs would exhibit a poor performance compared to non-governmental IPOs.

of the most liquid market segment of Austrian stocks which represents about 70% of total stock market activity. Simultaneously, it also serves as a basis for futures and options contracts. Regarding its construction principles, the ATX belongs to the category of capitalization-weighted value ratios. Note, however, that the market capitalization is corrected by a free float factor which ensures that the weight of a particular title in the ATX corresponds to the amount of capital actually available for public trading on the stock exchange. Since the ATX is intended to reflect all price changes caused by market fluctuations, the index is adjusted for technical price changes except for those due to dividend payments.

The Initial Public Offerings Index

The Initial Public Offerings Index (IPOX) covers all initial public offerings in the official market segment for a period of 18 months after their first listing, including newly issued stock of companies whose stock other than the new category has been listed earlier. Initial public offerings in the regulated and unregulated market segments are omitted from consideration.⁵ Each initial public offering enters the IPOX with the first price in public trading and *not* with the offering price in order to prevent the short-run underpricing phenomenon from affecting the index.

In order to render the ATX and the IPOX comparable to each other, that is, to exclude a systematic deviation of the IPOX from the ATX, the IPOX is constructed isomorphically to the ATX. The indexes have been identically constructed with respect to the index formulae, the adjustment instances, and adjustment procedures but differ in the composition of the index sample.⁶

The $IPOX_{ATX}$ and the ATX are calculated as

$$IPOX_t = IPOX_{t-1} \frac{\sum_{i=1}^m P_{i,t} Q_{i,t-1}}{\sum_{i=1}^m P_{i,t-1} Q_{i,t-1}}, \quad ATX_t = ATX_{t-1} \frac{\sum_{j=1}^n P_{j,t} Q_{j,t-1}}{\sum_{j=1}^n P_{j,t-1} Q_{j,t-1}} \quad (1)$$

where

$IPOX_t$ ~ $IPOX_{ATX}$ value at time t ;
 ATX_t ~ ATX value at time t ;
 t ~ time index;

⁵ *Bank Austria AG* and *Investitionskredit AG* have been removed from the index sample for the sake of analytical clarity. Due to historical and institutional reasons the risk structure of their shares is unlikely to be reproducible for any other Austrian company and would therefore unduly distort the comparison between the ATX and the IPOX.

⁶ Henceforth we denote the IPOX as $IPOX_{ATX}$ to indicate its constructional identity with the ATX.

- $P_{i,t}$ ~ the price of share i at time t ;
 $P_{j,t}$ ~ the price of share j at time t ;
 $Q_{i,t-1}$ ~ the number of shares of stock i outstanding at time $t-1$;
 $Q_{j,t-1}$ ~ the number of shares of stock j outstanding at time $t-1$;
 m ~ the number of stocks in the $IPOX_{ATX}$;
 n ~ the number of stocks in the ATX.

In order to study the performance of both the market segment of governmental and the segment of non-governmental IPOs, we split the $IPOX_{ATX}$ into two subindexes, viz. the $IPOX_{ATX, \ddot{O}IAG}$ and the $IPOX_{ATX, NO-\ddot{O}IAG}$.⁷ Since mid-December 1992 five (former) $\ddot{O}IAG$ companies have gone public on the Vienna Stock Exchange. The composition of the $IPOX_{ATX, \ddot{O}IAG}$ as of May 31, 1994, and as of October 31, 1995, is displayed in table 2.

Table 2
The composition of the $IPOX_{ATX, \ddot{O}IAG}$

| Company | Share price (31-05-1994) | Capital (in mill. ATS) | Weight in the $IPOX_{ATX, \ddot{O}IAG}$ (May 31, 1994) |
|---|-----------------------------|---------------------------|---|
| VAE AG | 1,515.00 | 140.00 | 12.47 % |
| AMS AG | 610.00 | 250.00 | 8.96 % |
| VA Technologie AG | 891.00 | 1,500.00 | 78.57 % |
| Company | Share price (31-10-1995) | Capital (in mill. ATS) | Weight in the $IPOX_{ATX, \ddot{O}IAG}$ (October 31, 1995) |
| VATechnologie AG | 1,098.00 | 1,500.00 | 49.35 % |
| Böhler-Uddeholm AG | 677.00 | 1,100.00 | 22.00 % |
| VA Stahl AG | 291.00 | 3,300.00 | 28.65 % |
| Source: Institute for Advanced Studies, 1995. | | | |

⁷ It may be argued that the definition of the $IPOX_{ATX, \ddot{O}IAG}$ as the sample of "governmental IPOs" is too narrow since it does not include stocks of companies other than those originating with the $\ddot{O}IAG$ Group. Instead, the stock of various companies in which federal, state, and local authorities held and continue to hold minority and, in some cases, majority stakes has been assigned to the $IPOX_{ATX, NO-\ddot{O}IAG}$ sample which therefore covers both stocks of private companies and formerly state-owned companies.

We have opted for this approach for two reasons. First, the enterprises of the $\ddot{O}IAG$ conglomerate played a preeminent role in Austro-Keynesianism. The impact of the priority given to macroeconomic stabilization relative to microeconomic efficiency can hardly be studied similarly well for any other sample of Austrian state-owned enterprises. Second, the $\ddot{O}IAG$ enterprises may be considered representative for Austrian privatization in the sense that their going public is the result of a long-term privatization program while going publics of other state-owned companies appear to be singular events.

The historical index sample of the $IPOX_{ATX, NO-ÖIAG}$ for the period from December 1992 to December 1995 is presented in the appendix (table A1).

6. The Aftermarket Performance of Governmental and Non-Governmental IPOs: Empirical Results

The projections of expected future profits by the issuing company are a distinctive feature of IPOs. As the underwriting bank(s) can, beside others, be held liable for wrong or misleading statements, the prospectus contains more comprehensive and reliable information than any other information source available to the outside investor. Considering the additional information as being a typical attribute of a stock to be defined as an IPO, we have reason to expect that this status will vanish at the end of the forecasting horizon which is one and a half years on average. For this reason one and a half years after the first listing on the stock exchange a stock does no longer qualify as an IPO and is thus withdrawn from the index.

The data used for the empirical analysis are of length 746, start on December 15th, 1992, and end on December 15th, 1995.⁸ The ATX and the $IPOX_{ATX}$ exhibit the following econometric properties, among others (HAEFKE and HELMENSTEIN, 1996b). The logs of ATX and $IPOX_{ATX}$ returns are characterized by significant sample autocorrelations of order 1. The results of Dickey-Fuller tests and Augmented Dickey-Fuller (ADF) tests for the ATX and the $IPOX_{ATX}$ series reveal that the series are stationary in first differences. ENGLE and GRANGER (1987) as well as JOHANSEN (1988) cointegration tests support the hypothesis of a cointegrating relationship between the ATX and the $IPOX_{ATX}$ at the 5% significance level.

In terms of cumulative returns, during the period under consideration all four indexes reached positive results (figure 1). The band-width of cumulative returns, however, ranges from of a meagre 7.0 % for the $IPOX_{ATX, NO-ÖIAG}$ to an extraordinary 132.9 % for the $IPOX_{ATX, ÖIAG}$ (table 3). Taking the ATX as benchmark, we find a cumulative excess performance of the $IPOX_{ATX, ÖIAG}$ by 83.7 % over a period of three years. The opportunity costs in terms of foregone earnings of holding the $IPOX_{ATX, NO-ÖIAG}$ portfolio, by contrast, cumulate to 15.6 % relative to the ATX.⁹

⁸ The starting date coincides with the listing of *VA Eisenbahnsysteme AG* as the first $ÖIAG$ initial public offering during the nineties.

⁹ The cumulative opportunity costs of investing in the $IPOX_{ATX, NO-ÖIAG}$ are calculated as the difference between the ATX and the $IPOX_{ATX, NO-ÖIAG}$ as a percentage of the ATX value as of December 15th, 1995.

Figure 1

IPOX_{ATX} - Subindexes

Governmental versus non-governmental IPOs

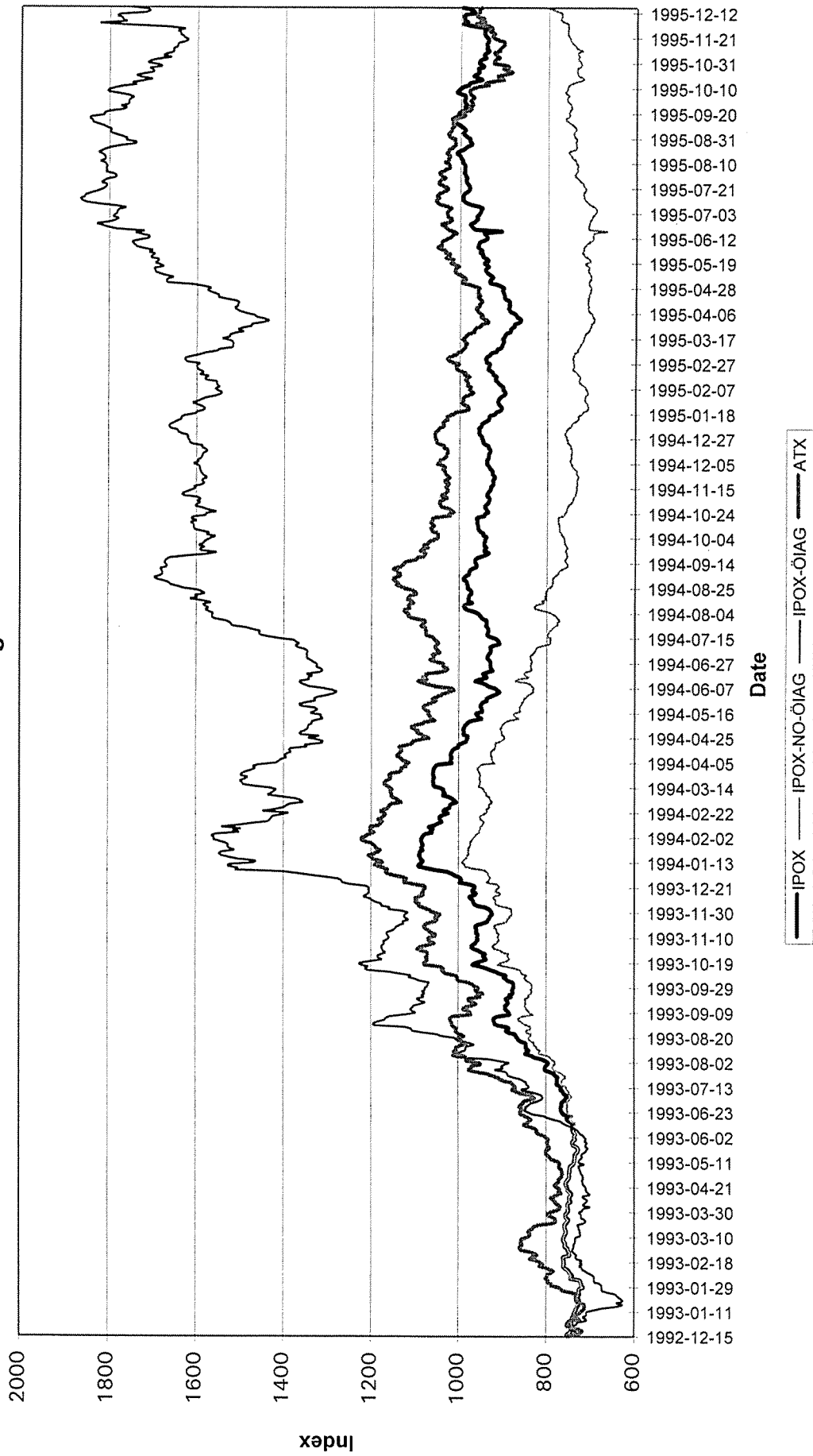


Table 3
Cumulative returns of the $IPOX_{ATX}$ and the ATX

| | $IPOX_{ATX}$ | $IPOX_{ATX, \text{O}IAG}$ | $IPOX_{ATX, \text{NO-O}IAG}$ | ATX |
|---|--------------|---------------------------|------------------------------|---------|
| Cumulative return 92-12-15 to 95-12-15 | 32.60 % | 132.92 % | 6.98 % | 26.82 % |
| Excess performance relative to the ATX | 4.56 % | 83.67 % | -15.64 % | 0.00 % |
| Source: Institute for Advanced Studies, 1995. | | | | |

Recall that we assume the additional information contained in the prospect to be a qualifying feature of an IPO. This aspect should affect the statistical properties of the $IPOX_{ATX}$ time series in terms of lower volatility relative to the stock market average since the discounted value of future profits is less uncertain.

Table 4
Dispersion of the $IPOX_{ATX}$ and the ATX

| | $IPOX_{ATX}$ | $IPOX_{ATX, \text{O}IAG}$ | $IPOX_{ATX, \text{NO-O}IAG}$ | ATX |
|---|----------------------|---------------------------|------------------------------|----------------------|
| Variance | 9,128.9 | 136,680.6 | 6,077.1 | 13,700.5 |
| Standard error of sample mean | 3.498 | 13.536 | 2.854 | 4.285 |
| Sharpe index (1)* | $4.64 \cdot 10^{-6}$ | $1.97 \cdot 10^{-6}$ | $-5.51 \cdot 10^{-6}$ | $1.91 \cdot 10^{-6}$ |
| Sharpe index (2)** | $3.18 \cdot 10^{-6}$ | $1.87 \cdot 10^{-6}$ | $-7.71 \cdot 10^{-6}$ | $0.94 \cdot 10^{-6}$ |
| *: average 3-month risk free rate: 5.63 %; **: average 10-year risk free rate: 6.96 %; Source: Institute for Advanced Studies, 1995. | | | | |

Table 4 confirms this conjecture. The $IPOX_{ATX}$ sample is featured by a lower variance and a smaller standard error of the sample mean than the ATX (table 4, rows 2 and 3). Note, however, that the $IPOX_{ATX, \text{O}IAG}$ exhibits the highest standard error of all indexes. This finding is, in part, due to some residual unsystematic risk that is left as a result of incomplete diversification of the $IPOX_{ATX, \text{O}IAG}$ portfolio.

In order to assess whether these results are sustained under a risk-return tradeoff, we calculate the Sharpe (1966) reward-to-variability ratio or Sharpe index as

$$SI = \frac{r_{index} - r_f}{\sigma_{index}} \quad (2)$$

with

r_{index} = annualized rate of return on a given index (IPOX, ATX) portfolio

r_f = risk-free rate of return

σ_{index} = variance of the returns of the index (IPOX, ATX) portfolio.

We find that the IPOX_{ATX} portfolio outperforms all other portfolios independent from the risk-free rate of return used for calculating the SI (table 4, rows 4 and 5). Due to its relatively low variance, the IPOX_{ATX} performs even better than the $\text{IPOX}_{\text{ATX}, \text{ÖIAG}}$. Hence, the excess return of the $\text{IPOX}_{\text{ATX}, \text{ÖIAG}}$ portfolio does not fully compensate the investor for the additional risk associated with the investment in governmental IPOs. For risk-free interest rates exceeding 8.24 %, however, the $\text{IPOX}_{\text{ATX}, \text{ÖIAG}}$ portfolio oversteps the other portfolios.

7. Concluding remarks

Our empirical analysis reveals a striking degree of variation in the performance of initial public offerings depending on ownership prior to privatization. The results confirm our first hypothesis that, compared to the market average, portfolios of Austrian governmental IPOs yield positive excess returns both in terms of cumulative returns and in risk-adjusted returns. We also find evidence in favor of our second hypothesis. During the period under consideration Austrian non-governmental IPOs underperformed the market average, and even more so the market segment of governmental IPOs. It remains to be inquired, however, whether our third hypothesis holds as well. According to this hypothesis the excess performance of governmental IPOs versus non-governmental IPOs is expected to wane during later stages of a privatization program. A test requires data of more advanced privatization programs than the Austrian one in order to allow for changes in the conduct of capital market participants due to learning processes.

From the viewpoint of private companies that intend to issue equity the realization of a large privatization program has implications that go beyond the usual competition for capital amongst issuing companies. In order to offset the advantage of the built-in potential of efficiency gains in favor of governmental IPOs, non-governmental IPOs are forced to offer higher returns which is equivalent to stating that private sector capital costs rise. We thus conclude that privatization at least temporarily inhibits the substitution of inside equity by outside equity in the private sector.

References

- ALCHIAN, A.A. and H. DEMSETZ (1972): *Production, Information Costs, and Economic Organization*, American Economic Review, vol. 62, pp. 777-795.
- BARTEL, R. and F. SCHNEIDER (1987): *Die Ursachen der Krise in der verstaatlichten Industrie. Einige theoretische Überlegungen*, Wirtschaftspolitische Blätter, vol. 34, pp. 275-301.
- BÖS, D. (1978): *Effizienz des öffentlichen Sektors aus volkswirtschaftlicher Sicht (The Efficiency of the Public Sector from the Economic Point of View)*, Swiss Journal of Economics and Statistics, vol. 114, pp. 287-314.
- CAPEN, E.C., R.V. CLAPP, and W.M. CAMPBELL (1971): *Competitive Bidding in High-Risk Situations*, Journal of Petroleum Technology, vol. 23, pp. 641-653.
- ENGLE, R.F. and C.W.J. GRANGER (1987): *Co-integration and Error Correction: Representation, Estimation and Testing*, Econometrica, vol. 55, pp. 251-276.
- FAMA, E.F. (1980): *Agency Problems and the Theory of the Firm*, Journal of Political Economy, vol. 88, pp. 288-307.
- HAEFKE, C. and C. HELMENSTEIN (1996a): *Neural Networks in the Capital Markets: An Application to Index Forecasting*, Journal of Computational Economics, vol. 9, forthcoming.
- HAEFKE, C. and C. HELMENSTEIN (1996b): *Forecasting Austrian IPOs: An Application of Linear and Neural Network Error Correction Models*, Journal of Forecasting, vol. 15, forthcoming.
- IBBOTSON, R.G. and J.F. JAFFE (1975): *"Hot Issue" Markets*, Journal of Finance, vol. 30, pp. 1027-1042.
- IBBOTSON, R.G., J.L. SINDELAR, and J.R. RITTER (1988): *Initial Public Offerings*, Journal of Applied Corporate Finance, vol. 1, pp. 37-45.
- ITZLINGER, A., R. KERSCHBAMER, and A. VAN DER BELLEN (1989): *Verstaatlichte Industrie (ÖIAG-Konzern)*, in: H. ABELE, E. NOWOTNY, S. SCHLEICHER, and G. WINCKLER (eds.): *Handbuch der österreichischen Wirtschaftspolitik*, 3rd edition, Manz Verlag: Vienna.
- JENSEN, M.C. and W.H. MECKLING (1976): *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, Journal of Financial Economics, vol. 3, pp. 305-360.
- JOHANSEN, S. (1988): *Statistical Analysis of Cointegration Vectors*, Journal of Economic Dynamics and Control, vol. 12, pp. 231-254.
- KOHN, L. (1978): *Effizienz des öffentlichen Sektors als Politikeffizienz (The Efficiency of the Public Sector from a Policy Point of View)*, Swiss Journal of Economics and Statistics, vol. 114, pp. 315-330.
- NISKANEN, W.A. (1971): *Bureaucracy and Representative Government*, Chicago and New York.
- NISKANEN, W.A. (1975): *Bureaucrats and Politicians*, Journal of Law and Economics, vol. 18, pp. 617-643.

- NOWOTNY, E. (1986): *Verstaatlichte und private Industrie in der Rezession - Gemeinsamkeiten und Unterschiede*, WISO - Wirtschafts- und sozialpolitische Zeitschrift des ISW, vol. 2, pp. 71-95.
- ÖSTERREICHISCHE INDUSTRIEHOLDING AG (1995): *Der Privatisierungsweg der Österreichischen Industrieholding AG*, Österreichische Industrieholding AG: Vienna.
- OSTLEITNER, H. (1990): *Die Zukunft des Keynesianismus im politischen System Österreichs*, in: P. MITTER and A. WÖRGÖTTER (eds.): *Austro-Keynesianismus*, Festschrift für Hans Seidel, Physica-Verlag: Heidelberg.
- RITTER, J.R. (1987): *The Costs of Going Public*, Journal of Financial Economics, vol. 19, pp. 269-281.
- RITTER, J.R. (1991): *The Long-run Performance of Initial Public Offerings*, Journal of Finance, vol. 46, pp. 3-27.
- ROCK, K. (1986): *Why New Issues are Underpriced*, Journal of Financial Economics, vol. 15, 187-212.
- SHARPE, W.F. (1966): *Mutual Fund Performance*, Security Prices: A Supplement, Journal of Business, vol. 39, pp. 119-138.
- THALER, R.H. (1988): *The Winner's Curse*, Journal of Economic Perspectives, vol. 2(1), pp. 191-202.
- TICHY, G. (1983): *Gemeinwirtschaft und Wirtschaftspolitik in Österreich*, Zeitschrift für öffentliche und gemeinwirtschaftliche Unternehmen, vol. 6, pp. 147-156.
- VICKERS, J. and G. YARROW (1991): *Economic Perspectives on Privatization*, Journal of Economic Perspectives, vol. 5, pp. 111-132.
- WASSERFALLEN, W. and C. WITTLER (1994): *Pricing Initial Public Offerings: Evidence from Germany*, European Economic Review, vol. 38, pp. 1505-1517.

Appendix

Table A1
The historical index sample of the IPOX_{ATX, NO-ÖIAG}

| Company | Date of inclusion in the index |
|--|--------------------------------|
| Agrana Pref. | Dec. 14, 1992 |
| Bank für Tirol & Vorarlberg Pref. | Nov. 29, 1993 |
| Bau Holding Com. | Oct. 18, 1993 |
| Billareal Com. | Jun. 10, 1994 |
| Binder Com. | Dec. 14, 1992 |
| BKS Pref. | Dec. 14, 1992 |
| BWT Com. | Dec. 14, 1992 |
| Constantia ISO Holding Com. | May 22, 1995 |
| Constantia Verpackungen Com. | May 22, 1995 |
| Erste Österreichische Sparkasse Pref. | Nov. 22, 1993 |
| Flughafen Wien Com. | Dec. 14, 1992 |
| Kapital & Wert Com. | Dec. 14, 1992 |
| Kies-Union Com. reg. | Dec. 14, 1992 |
| Mayr-Melnhof Com. | Apr. 22, 1994 |
| Oberbank Pref. | Dec. 14, 1992 |
| ÖMAG Com. | Dec. 14, 1992*) |
| Ottakringer Com. | Nov. 10, 1994 |
| Pengg Kabel Com. | Dec. 21, 1992 |
| Rosenbauer Com. | Sep. 27, 1994 |
| UBM Pref. | Dec. 14, 1992 |
| Viso Data Com. | Dec. 14, 1992 |
| Vogel & Noot Wärmetechnik Com. | Jul. 13, 1995 |
| Wiener Städtische Pref. | Oct. 17, 1994 |
| Wienerberger Immobilien Com. | Dec. 14, 1992*) |
| Wolford Com. | Feb. 14, 1995 |
| *) Date of withdrawal from the sample: Feb. 03, 1993. Source: Institute for Advanced Studies, 1995. | |

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